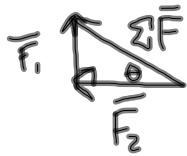


Practice Problems and Lab Help 3.6.12 Honors Physics

Hockey puck has a mass of .113 kg  
and is struck with two sticks simultaneously.  
One stick applies a force of 2 N north, and  
the other stick applies a force of 3 N west. What  
is the acceleration of the puck (magnitude,  
angle, direction)?

FBD:



magnitude of  $\Sigma \vec{F}$ : Pythagorean thm.

$$\Sigma F = 3.61 \text{ N}$$

angle:  $\tan^{-1}$  or  $\sin^{-1}$  or  $\cos^{-1}$

$$\theta = 33.7^\circ$$

direction: N of W

To find acceleration, use Newton's 2nd L

$$\Sigma \vec{F} = m\vec{a}$$

$$a = \frac{\Sigma F}{m}$$

$$= \frac{3.61 \text{ N}}{.113 \text{ kg}}$$

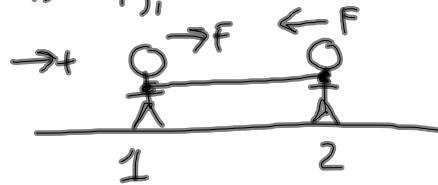
$$= 31.95 \text{ m/s}^2$$

\* angle &  
direction of  
net force &  
acceleration  
the same

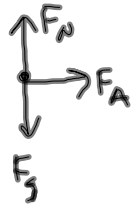
$$\vec{a} = 31.95 \text{ m/s}^2 @ 33.7^\circ \text{ N of W}$$

# Practice Problems and Lab Help 3.6.12 Honors Physics

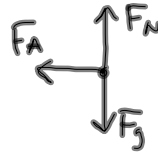
Two people are standing on a frictionless surface connected by a rope. One person has mass of 60 kg, and when he pulls at some force experiences an acceleration of  $2 \text{ m/s}^2$ . If the mass of the other person is 45 kg, what is their acceleration?



FBD 1:



FBD 2:



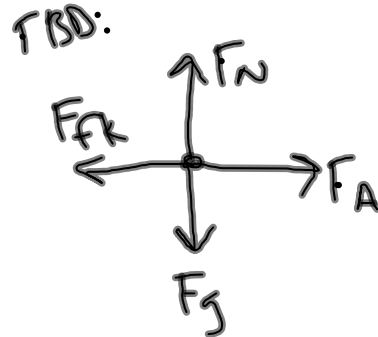
$$1: \quad m_1 = 60 \text{ kg} \quad a_1 = 2 \text{ m/s}^2$$

$$\begin{aligned} \sum F_x &= m_1 a_1 \\ &= (60 \text{ kg})(2 \text{ m/s}^2) \\ &= 120 \text{ N} \end{aligned}$$

$$2: \quad \sum F_x = 120 \text{ N} \quad m_2 = 45 \text{ kg}$$

$$\begin{aligned} a_2 &= \frac{-\sum F_x}{m_2} \\ &= \frac{-120 \text{ N}}{45 \text{ kg}} \\ &= -2.67 \text{ m/s}^2 \end{aligned}$$

Coefficient of Kinetic friction when object is pulled at constant velocity:



$$F_{fk} = \mu_k F_N$$

$$\mu_k = \frac{F_{fk}}{F_N}$$

$$= \frac{F_A}{m a_g}$$

plug in numbers,  
get answer

$$\sum \bar{F}_x = 0$$

$$\bar{F}_A - F_{fk} = 0$$

$$F_{fk} = F_A$$

$$\sum F_y = 0$$

$$F_N - F_g = 0$$

$$F_N = F_g$$

$$= m a_g$$